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## ECONOMIC POLICY, ORGANIZATION AND MANAGEMENT

### PROBLEMS OF ASSESSING ECONOMIC EXPERIMENT RESULTS CITED

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA EKONOMICHESKAYA in Russian No 2, Mar-Apr 85 pp 16-25

[Article by G.K. Gubernaya and N.G. Chumachenko]

[Text] The article contains an examination of the opportunities and significance of economic experiments, as well as problems related to the reliability of their results and to assessments which are influenced by features of the interaction between economic science and economic practice, and by the specific features of the object of experimentation. The first results of the large-scale economic experiment which is being carried out in our country have been generalized. Most of the attention is devoted to the search for ways to increase the effectiveness of experiments in the national economy.

Economic experiments are one of the manifestations of integrative processes in the formation of knowledge about the present-day world. As early as the first years of fundamentally new economic construction in a socialist society V.I. Lenin pointed out the need and the inevitability of experimentation: "We had no doubts that we would have to experiment,... to perform tests. We were undertaking something which no one else in the world had undertaken on such a scale" [3].

Economic experimentation has become a very important method for validating and testing innovations in the area of organization, planning and management. Our country has accumulated a great deal of experience in the preparation and conduct of economic experiments: the 1965 economic reform, the Shchekino method, the introduction of complete self-financing in the system for the management of Moscow's motor vehicle passenger transportation, the brigade form for the organization and provision of incentives for labor, the comprehensive system for the management of the primary production unit (at the Volga Automobile Plant and the Kaluga Turbine Plant), the normative method for the planning of

wages, etc. At the same time positive experimental results have not received the intended dissemination (see, for example, [13]). Most economists see the cause of this discrepancy in the lack of methodological material and the lack of a thoroughly and comprehensively developed theory. Of course, scientifically based programs, plans and general methodological assumptions on the organization and planning of economic experiments, as well as specific methods which give concrete form to their preparation and conduct in various sectors, could provide greater validity and more orderliness in carrying out experiments, and consequently, they could increase the degree of reliability in the results. However, in our view one must look deeper for the causes of these discrepancies. The problem of result reliability for economic experiments arises to a large degree from characteristics of the interaction between economic science and economic practice, as well as the specific features of the object of experimentation.

In the natural sciences and technology a scientific idea, the opportunity (the right) to verify it experimentally and personal interest in the experiment are the privilege of any one subject (any scientific, design or similar subdivision); but in the area of economic science matters are somewhat different. New ideas, hypotheses, conclusions and their foundations are functions of science; but granting the right to experiment is a function of the socialist state; interest in conducting the experiment and its results are the prerogative of the respective economic subdivision. But all public institutions have an identical interest in the experimental results only and in whether they are adequate to the real tendencies in the development of a socialist economy.

This state of things means that economic science does not have an opportunity to verify immediately the concepts (laws, categories) and propositions which it has worked out, and a certain period of time is necessary to approve them practically. But at the same time experience continues to make its own adjustments to the dynamics of objective economic activities. This determines the specific nature of the relationship between the absolute and relative truths in economic ideas: at the moment when scientific conclusions are formed, they already prove to be incomplete or inaccurate. Here lies one of the fundamental contradictions of the interrelationship between economic science and economic practice; it is one which presumes the need for the accelerated development of economic theory. And in turn, speeding up the development of the science excludes the possibility of experimentally verifying its basic conclusions and propositions under real, given conditions of economic functioning because they still have not yet "ripened" enough for one to perceive the completeness of that which is new. As V.I. Lenin pointed out, resolving the same question "practically or theoretically is not the same" [4]. The history of economic experiments in our country confirms this.

The economic environment gives rise to problems, and the forward development of the economy depends on their resolution. These problems manifest themselves in the form of concrete economic contradictions. In order to eliminate them it is necessary to clarify their causes and the patterns of their emergence and resolution under actual conditions of economic activity. F. Engels emphasized: "An empirical observation by itself can never sufficiently prove a need" [2]. Only dialectical materialism as a method of Marxist-Leninist scientific cognition explains objective reasons for contradictions, and it not only explains but also shows in which direction and how they must be eliminated. In the diversity of the concrete, economic science, while digressing from it, reveals the objective nature of contradictions as an abstract universal.

However, the truth is always concrete. Objective contradictions are expressed in the real relations which have developed, and they can be resolved only by transforming practice, i.e., by changing these relations. Thus the researcher is forced to return to the "empirical" as a criterion and fundamental principle of scientific truth. "In order to understand," wrote V.I. Lenin, "it is necessary to begin to understand empirically, to study, to ascend from the empirical to the general" [5].

In the transition from the abstract to the concrete and to the search for concrete forms for the manifestation of abstract truth, the advantages of an experiment are undoubted. The value of experimental verification lies in the clearness of the testing process and the obviousness of the result (positive and negative). Let us note, however, that the truth of fundamental laws and categories of economic science does not require experimental approval. As a result of the previous experience of many generations, it has been confirmed by history. Science, too, makes use of this experience.

In all areas of human activity practice precedes science. In this regard economic science is no exception. Any given proposition of economic theory is only a consequence of social needs. But it manifests itself in a general, abstract form, i.e., in the general line of society's economic development and in the objective conditions which, depending on the state of productive forces, determine the direction of development and the limits of people's "freedom of action." In other words, the propositions of the science, which are predetermined by practice, are those abstractions which have real objective content. An abstract (objective) truth does not need experimental verification, i.e., that which is outside man's will and consciousness and which is objective is just as objectively not subject to experimentation. An experiment verifies the expediency (effectiveness) of those concrete forms of the manifestation of the abstract which man chooses and by which he operates under real conditions. Any given scientific

proposal to improve and to change concrete forms and methods of economic functioning needs experimental testing in those cases in which science does not--or in principle cannot--provide the scientific substantiation for a system's possible reactions to an innovation. Thus, the area of an economic experiment is the search for concrete forms to express an abstract (objective) truth, forms which are adequate to concrete conditions; the goal is to reveal the possible reactions of different level systems which can be manifested only in economic behavior and which cannot be discovered through scientific or theoretical substantiations. An experiment makes it possible to answer the question "to be or not to be" to an economic innovation, to determine whether it requires further improvement and if it does, what kind of improvement is required. The possibility of substantiated answers to questions asked of an experiment by actual practice was explained methodologically by K. Marx himself in the preface to "A Criticism of Political Economy": "...mankind always poses for himself only those tasks which it can solve because when very close consideration is given, it always turns out that the task itself arises only when the material conditions for its resolution are already present, or, at the very least, are in the process of becoming" [1].

A characteristic feature of the current period of economic development is the improvement of economic management: the strengthening of the primary economic unit has given rise to the opportunity to expand democratic principles in management and planning. The problem is to ensure that associations (enterprises) show a genuinely proprietary interest in the intensification of production and the improvement of the qualitative indicators of economic activities. New methods and forms of economic management are being approved to resolve this problem. They are being realized in practice in an economic experiment which has been carried out in certain branches of industry since January 1984 in accordance with the 14 July 1983 decree of the CPSU Central Committee and the USSR Council of Ministers "Concerning Additional Measures to Expand the Rights of Industrial Production Associations (Enterprises) in Planning and Economic Functioning and to Increase Their Responsibility for the Results of Work." Speaking at the February (1984) plenum of the CPSU, Comrade K.U. Chernenko, general secretary of the CPSU Central Committee, pointed out the need, content and goal of the work: "The system for management of the economy and our entire economic mechanism is in need of serious reconstruction. The work in this area has only just begun. It includes a large-scale economic experiment to expand the rights and increase the responsibility of enterprises. A search is going on for new forms and methods of economic management in the service sphere. Undoubtedly they will provide much that is useful, and they will help us to resolve a strategically important problem, which is to raise the effectiveness of the entire economy" [7].

We will note one more feature of the interrelationship between economic science and the object of its study, which consists in the uniqueness of the object itself. In economics we deal with complex, unique, open systems; experimentation with them cannot be carried out according to the same schemes and rules which apply in the natural sciences. In addition, social reproduction is a weakly-structured system with problems of the same kind. At the same time the idea analyzing these poorly structured problems and searching for ways to work them out seems promising. The development of methods for a systems approach and of the instrumentation for systems analysis and computer modeling inspires confidence in its successful resolution.

The economic theory of socialism has the opportunity to verify the truthfulness of its conclusions and recommendations in large-scale economic experiments. But the latest large-scale experiment is being carried out in individual sectors which are a component of a single whole--the national economic complex. This means that although the goal, tasks and limits of the experiment are assigned, its results depend not only on the functioning of the experimental object but also on its numerous and substantially significant external links.

These circumstances give rise to the specific possibilities of economic experiments and to the equally specific correlations of their goals and results, i.e., to the problem of reliability.

The large-scale experiment which is being carried out in the country at present confirms what has been said. Only the first steps have been taken, and it would be premature to make far-reaching conclusions or to accept the first results as a reliable final result. An enormous quantity of diverse, at times mutually contradictory facts make any extreme judgment not very reliable. It is all a matter of selecting from the aggregate of facts and interpreting them. V.I. Lenin wrote: "In the area of social phenomena there is no method more widespread and more groundless than snatching at individual facts or playing with examples. Selecting examples in general does not take any work, but this has no significance or a purely negative significance because the whole matter lies in the historical, concrete conditions of individual cases. Facts, if one takes them in their entirety and in their relationships are not only a "stubborn" but also an undoubtedly convincing thing" [6].

The progress and first results (let us call them intermediate results) of an experiment are being widely covered in the press. One can already learn how the main clauses of the decrees of the CPSU Central Committee and the USSR Council of Ministers are being carried out; the first results obtained at individual enterprises can be generalized. As we noted, "today it is important to analyze carefully the successes and failures in the

work of the collectives which make use of the principles of the economic experiment. It is clear that for now those reserves which can be found at the surface have been put into operation" [15].

The experiment calls for the following: the provision of a longer pre-plan period; guaranteed stability in the plan, which is balanced in terms of material and labor resources; the expansion of enterprises' rights in the development of plans; a reduction in the number of indicators planned for enterprises; expansion of opportunities for strengthening initiative and a creative attitude toward work and an intensified analysis of production reserves.

These general statements are fully interpreted in concrete actions: in the strengthening of economic relations between suppliers and consumers; in broader authority for enterprises (associations) in the area of capital construction, sales and price formation; in the right to dispose independently of funds for production development and socio-cultural measures. Even at the first stage the important positive results of the experiment include stimulating scientific-research work which brings together scientists and practical workers and restructuring economic thought and the ideology of economic management.

The first results of the work of more than 700 collectives which are carrying out practical testing of the new principles of economic management seem to be promising for two reasons. In the first place, they testify to the growing role of qualitative, centrally monitored indicators of economic activity and to the development of creative initiative. In the second place, they make it possible to treat more fully, practically and tangibly the problems of present-day economic management and to set out ways to solve them. The solutions provide the opportunity to utilize the objective advantages of socialism within the concrete forms of their economic realization. The inadequacies do not result from the experiment; they are only brought to light by it. Discovered and viewed within the process of the experiment, they simplify the search for concrete forms, methods and norms for positive transformations in economic activity.

Materials from publications and special studies show that the first results of the experiment are not unambiguous. We studied them and made an attempt to generalize them.

The level of contract discipline has become significantly higher at all enterprises of five ministries. More than 90 percent of the enterprises are fulfilling delivery contracts. The following are greater than planned and greater than the figures for a similar period last year: the rate of growth in labor productivity, the rate at which new items and manufacturing processes

have been put on stream and the rate at which raw material and energy resources are being saved. At 29 Moscow enterprises these indicators are higher than the average for their respective sectors [16]. But the comparison yields other results as well. For example, Dnepropetrovsk Oblast machine building and metal working enterprises which are not participating in the economic experiment show a growth rate for marketable output and labor productivity which is higher than at similar enterprises operating under the experimental conditions. In the first quarter of 1984 enterprises of the Ministry of the Electrical Equipment Industry in Donetsk Oblast showed increased losses of working time in comparison with the same period in 1983. At some enterprises in the Kharkov, Donetsk, Voroshilovgrad and Dnepropetrovsk Oblasts the rate of growth in the average wage exceeded the rate of growth in labor productivity. This means that it is necessary to evaluate the results, comparing the indicators for the functioning of enterprises operating under various conditions. This is all the more important because with regard to the "external environment," enterprises included in an experiment are placed in more favorable conditions than others. For example, nearly all the enterprises of the Donetsk and Dnepropetrovsk Oblasts which operate under the experimental conditions were assigned 1984 plan targets which were at a level lower than that stipulated for that year by the five-year plans. They have been given favorable material-technical supply conditions (we are talking not about preferential treatment with regard to deliveries but about the establishment of a supply procedure). For some enterprises there has been a significant reduction in the number of those who receive of their output.

One of the features of an economic experiment is related to the need to carry out impartial observation, which is one of the conditions of effective experimentation.<sup>1</sup> However, every experimental observation in economic practice is accompanied by interference in the economic object and leads to the activization of subjective factors, as well as to the growth of their role in the implementation of economic processes. From this it follows that the results of a local experiment cannot be interpreted in the same way as scientific conclusions about the objective laws of the system in general; nor can they be transferred without adjustments to other localized economic facilities.

A particular feature of economic experiments arises not only from the fact that the experimenter is dealing with open systems. In the reproductive system of socialism the definite nature of the organizational limits of an economic facility does not eliminate the universality of economic interrelationships. This means that one result (indicator) is the consequence of a multitude of such reasons (factors), some of which are not determinable given man's present cognitive possibilities. The problem is made more complex by the incompleteness and the unreliability of economic

information, the formation and evaluation of which depend on people and consequently are to no small degree subjective.

In sum, having carried out an experiment, people obtain results which are sometimes far from those (or are not only those) they were counting on. For example, staff members at the UkSSR Academy of Sciences Institute of Industrial Economics carried out a study of enterprises operating under experimental conditions in the Donetsk, Dnepropetrovsk, Voroshilovgrad and Kharkov Oblasts, analyzed the data obtained and received the following positive and negative results. Everywhere production plans were confirmed within shorter time periods; material-technical supply improved significantly; opportunities for enterprises and associations to finance production re-equipment projects expanded; enterprises and associations were granted the right to specify wholesale prices for semi-finished products, units and parts used within a ministry; there has been a significant expansion in their rights to provide incentives for particularly important projects and for workers who have made a significant contribution to the general results of work. But at the same time the list of problems discovered has proved to be significant.

For example, the experimental conditions are violated frequently; as a result the economic relations which the experiment was designed to improve have remained unchanged. For example, as of 1 January 1984 orders for material resources placed by enterprises and associations operating under experimental conditions were authorized by Gosplan for 100 percent fulfillment in accordance with the given specifications. But even in this case the volume of actual deliveries is does not meet requirements, despite the Gosplan USSR decree, which specifies that materials needed to complete items produced by the enterprises participating in the economic experiment must be delivered in full (100 percent) according to the authorized orders. In addition, as a result of the lack of floating reserves, the funds allotted for 1984 only provide for the market plan, without taking into account the normative manufacturing reserves which are essential for enterprises to operate in a smooth, steady manner in the future.

The so-called advance funds supply authorization, which does not meet an enterprise's needs for particular resources or for a particular schedule of deliveries, is being retained. Many enterprises change their suppliers of standard output systematically--not only from year to year but also from quarter to quarter.

Enterprises are not making use of the expanded opportunities for technical renovation because--while they have money resources--they do not have other conditions to carry out this kind of renovation. Credit to carry out highly effective measures for

re-equipping fixed capital is not being requested, and this source of financing is not stipulated in the 1984 plans for technical development of production. For this reason it has not yet been possible to achieve a substantial acceleration of scientific-technical progress.

Progressive norms and economic quotas for long-term action are being poorly utilized in the planning and evaluation of the work of enterprises and associations. And even in those places where they are being introduced, the data from the report periods rather than scientifically substantiated calculations serve as the basis for the development of these norms. Strict custody of enterprises is being preserved. The number of parameters which are controlled by higher organs is being increased in an unwarranted manner. The inconsistency between the principles of planning and providing incentives has become obvious. The conditions for awarding bonuses to management employees have remained unchanged although their personal responsibility for the fulfillment of the production program has increased.

But the main point is that the testing of new methods of economic management has been hampered primarily by a lack of balance and instability in the plans.<sup>2</sup> The general director of the Armelektromash Association, R. Amiryan, graphically and accurately described the significance of the plan guarantees: "A large association is like a ship which must navigate its chosen course and be stable in any weather. To achieve this the navigational maps must be accurate and the ship must have lots of room to maneuver" [9].

Thus, the specific nature of the economic system as a system of the open type, as well as the diversity and features of the interrelationships and mutual dependence of the operations of economic subdivisions, give rise to the need for further work on the problem of economic experiments, on the development and improvement of their principles, and, in specifically the principle of an experiment's "purity."

In order to eliminate the effect of external conditions on the results of an experiment it is necessary to determine--in addition to an experimental group--a control group of enterprises which are typical of the sector and which operate under equivalent conditions, but according to the old system of management. In other words, greater accuracy in any comparative evaluation and, consequently, in the conclusions about the effectiveness of the new management principles can be ensured only if all conditions, except those specified by the experiment are identical. A. Prigozhin comes to a valid conclusion: "A comparison of the results from the experimental and control facilities would help to reveal the "pure" result of management experience" [13, p 66].

The costs resulting from the complexity of the economic systems involved in the experiment are being reduced substantially as its limits are expanded. The results of the first months have already shown that the work carried out under the new conditions must include those who supply the resources and consume the output of the enterprises and associations participating in the experiment, with the aim of verifying more carefully the effectiveness of the norms stipulated to expand the rights and increase the responsibility of enterprises (associations) for the results of their economic activity. It is also obvious that the experiment should include organs of Gosplan, the ministries, transportation organizations, etc. As K.U. Chernenko emphasized at an appearance before an electors' meeting: "The search for and introduction of that which is new must be carried out not just by the enterprises included in any given experiment" [8].

The results of the work performed under the conditions of the economic experiment testify to its beneficial influence on the economic activity of the enterprises and on the affairs of the labor collectives. At the same time it was discovered that not all of the possibilities in this area are being utilized to the fullest degree. In particular, the principles of self financing in the operations of the labor collectives are being developed more slowly than necessary. There has emerged a need for change in the working style and methods of scientific, technical and construction subdivisions; sectors; associations and enterprises.

Taking all of this into account, the USSR Council of Ministers adopted a decision to continue the economic experiment and expand its scale. Beginning in January 1985 a number of other branches of the economy, including five Union ministries will participate in the experiment; they are the Ministry of Instrument Making, Automation Equipment and Control Systems; the Ministry of Chemical and Petroleum Machine Building; the Ministry of the Machine Tool and Tool Building Industry; the Ministry of Power Machine Building and the Ministry of Tractor and Agricultural Machine Building. The food industry ministries of Azerbaijan, Belorussia, Latvia, Moldavia and Estonia will participate in the experiment, as will the BSSR Ministry of the Meat and Dairy Industry, the RSFSR Ministry of the Fishing Industry, a number of republic-level ministries of light industry and household services and enterprises in a number of other sectors.

At the same time it was decided to adopt a number of concrete supplementary measures to improve the conduct of the economic experiment. There is no doubt that all this will increase still further the experiment's role in the intensification of the economy, in the improvement of its management and in the resolution of essential economic and social problems.

One of the conditions for effectiveness in the implementation of an experiment is lack of bias (objectivity) on the part of the researcher carrying out the experiment. By virtue of the specific characteristics of economic experiments, meeting this condition in the conduct of an experiment makes the reliability of the results problematical. The participant in economic processes, like a participant in any other social process, is not only a subject but also an object of knowledge. By itself the impossibility of "splitting the self" calls into question the objectivity of the research. The task set by the ancients, "know thyself" is even now far from being resolved, no matter what aspects of human activity are concerned.

In addition, when various scientific schools or directions are working on any given theoretical solutions which require experimental verification, they may sometimes try to attain the right to introduce these solutions on the strength of factors other than scientific arguments (see [11]).

Economics is an area of action for people, who are endowed with consciousness and will. For this reason transforming individual consciousness (knowledge) into social consciousness requires broad public discussion of the search for and interpretation of the truth, a discussion which precedes an experiment.

As a consequence of this, absolutizing the significance of economic experiments, ascribing to them properties which they do not possess and presenting good intentions as ready and reliable results all have a negative influence on the formation of public opinion and the corresponding level of social activity directed at economic experiments.

The uniqueness of every economic organism, no matter what its scale, makes it impossible to completely standardize experimental methods. An experiment only determines the goal and the limits of the search, within the framework of which every economic subdivision realizes all the diversity of its features and opportunities in the selection of the shortest and most economical ways (methods) to achieve the goal, while at the same time providing incentives for social action on the part of the collectives. The development and dissemination of standardized methods as universally mandatory for all economic units gives rise to the social standardization of diverse collectives: the universal expectation of such methods develops social passivity; publicity for results not yet obtained undermines trust and reduces the fruitfulness of undertakings. In sum, "disappointed public opinion" is formed not only about the particular experiment which is under discussion, but also about economic experiments in general. The lack of standardized, detailed procedures is frequently cited as a justification by those who cannot--due to an official incompatibility--or do not want to act with initiative

or creativity, although an experiment presents opportunities for it. And this is perhaps one of the reasons why economic undertakings, which have been theoretically proven, verified by practice and confirmed in their effectiveness, are held up for a long time at the experiment stage, without receiving broad dissemination. For example, it is claimed--without justification--that one benefit of an experiment is that the enterprises (associations) are provided with production plans long before the start of the new economic year. But it goes without saying that there is a need to know the production program and to have sufficient time to prepare for its implementation; this does not require experimental verification.

Of course, experience shows the need to improve the basic premises and methods of an economic experiment. But improvement must take place not along the lines of specifying the details of an enterprise's economic behavior but rather along the lines of a clear division of functions among the various subdivisions of an economic unit in the area of the solutions which are being tested: every unit must have guaranteed limits of need and freedom. For example, the rights of production collectives have been noticeably expanded on the basis of the Law Concerning Labor Collectives. But there is no mechanism for the realization of these rights. Responsibility is guaranteed in only one direction--"from bottom to top." There is not yet any counter movement of "top to bottom" responsibility for the quality and timeliness of decisions.

Mutual responsibility and guarantees of rights create the real conditions for a) the development of initiative and creativity on the part of labor collectives, as well as managers at various levels, and for b) the complete realization of the principle of democratic centralism in planning and management.

An analysis of the problems of economic experimentation makes it possible not only to see the limited possibilities of local economic experiments but also to determine these possibilities in a meaningful way. While verifying the correctness of a theoretical solution, an experiment can also yield a multitude of practical solutions to the same problems, the representative nature and diversity of which enable science and the management of an enterprise to discover and formulate basic and universal principles for future improvement in the practice of economic management in general.

Economic experiments develop the ability to make use of economic theory, contributing in this way to improvements in the interrelationship between economic science and practice. An experiment also makes it possible to see in the present "the shoots of the future" and to determine the conditions under which these shoots may successfully develop within the limits set by the

experiment. But whether these findings will turn into a new, improved system of management depends not so much on the experiment as on the general interest expressed in improving the system of economic management, and on whether this interest is provided for in all subdivisions of the economy, i.e., on how successfully scientific conclusions can be combined with a) the rights of economic units to implement these conclusions in practical terms and b) interest in reliable experimental results. The possibility of such a combination is ensured by the development of democratic bases in the management of a socialist economy; this was stipulated by the large-scale economic experiment which is being conducted in the country.

From this viewpoint, judging by the first results which have been obtained, a number of problems stand out; the solutions to these problems are linked to intensification, expansion and improvement in the conditions of experimentation.

1. It is essential to define strictly and to formulate clearly the legal guarantees of enterprises' independence in planning and management. At present they are being interpreted too broadly. The expansion of an enterprise's concrete rights should also be supplemented by a corresponding narrowing of the rights of departments. This is particularly important when the experiment's sphere is expanded.
2. All plan documents must be coordinated and oriented toward the development of democratic bases in management. For example, the Methodological Instructions on the Development of Five-Year Plans and Yearly Plans for Economic and Social Development contains virtually no mechanism for realizing enterprises' rights in the area of planning, or for creating economic conditions for increasing enterprises' responsibility for the fulfillment of delivery obligations and the plan.
3. There is an obvious need for this kind of coordination of all elements of economic activity; it would direct the functioning of these elements toward the experimental verification of reciprocal innovations.
4. Substantiated norms for expenditures of material, labor and financial resources and norms for the economic behavior of collectives and individuals must be worked out because scientifically substantiated norms are a kind of social filter which does (or does not) make it possible to recognize individual expenditures and individual behavior as socially necessary and advisable.
5. Indicators for the evaluation of experimental results need to be made more concrete and standardized, as do the time periods for summing up results; they create opportunities to repeat (reproduce) innovations in the form of observable phenomena and,

consequently, to ensure the repetition of experimental results and the conditions for comparison and conclusions.<sup>3</sup>

But any improvements in the economy yield a socially significant effect only when they are carried out in accordance with a scientifically defined and practically specified goal. This influences the requirements for the formulation of a goal. The specific formulation of a goal unites what should be and what is possible to implement under the given material-technical and social-economic conditions; like a well-laid out route it excludes (or substantially reduces) the danger of straying from the road which consists of the requirements set by the objective laws of socialism.

The goal of the current large-scale economic experiment in the USSR is to turn labor collectives into the guarantors of the following: scientific-technical progress, the economical utilization of resources, the achievement of balance between labor measures and consumption measures, the indoctrination of a high level of labor discipline and a creative attitude toward work, and the satisfaction of public needs in all their diversity and volume.

The first results of the experiment have given rise to the first questions, the answers to which will contribute in the subsequent development of the experiment to adjustments in the mechanism of economic management in accordance with the goals set before the national economy of the country by the party and the government.

#### FOOTNOTES

1. Man's intervention also influences other types of systems when they are subject to experimentation. M. Born noted: "Every observation is accompanied by intervention and leads to a disturbance in the state of the object being observed" [10].
2. Evidence of what this leads to can be found in the difficult economic and related psychological conditions in which the Moscow Dinamo Plant found itself as a consequence of "adjustments to the plan" [14].
3. In the philosophical literature one can find the opposite conclusions, which state that "with regard to complex systems the reproducibility of experiments cannot in any way be viewed as an absolute criterion for the objectivity of empirical knowledge. The fulfillment of other theoretical-systems requirements related to the parameter of reliability must function as these criteria" [12, p 94]. However, this kind of general conclusion is not complemented by constructive propositions; it is not revealed in them.

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## ECONOMIC POLICY, ORGANIZATION AND MANAGEMENT

### CSA OFFICIAL URGES ELIMINATION OF EXCESSIVE PAPERWORK

Moscow VESTNIK STATISTIKI in Russian No 3, Mar 85 pp 6-13

[Article by I. Pogosov, deputy chief of the USSR Central Statistical Administration, candidate of economic sciences: "Tasks for Improving the System of Accounting and Accountability, Increasing Their Effectiveness and, on the Basis of This, Reducing Document Turnover"]

[Text] Accounting and accountability are important instruments for planned management of the socialist national economy. Statistical information is used as a basis for analyzing economic and social development, developing national economic plans and monitoring their implementation.

The system of accounting and accountability is constantly being improved in keeping with the tasks that are being carried out in individual stages of the economic development of the national economy and changes in the structure of management, planning and the economic mechanism. The party and government attach a great deal of significance to this. The decisions of the 26th CPSU Congress set the task of improving the quality and increasing the efficiency of accounting and statistics, improving accounting documentation and accountability in all units of the national economy with respect to modern requirements for management, planning and analysis of economic activity, with effective utilization of electronic computer equipment.

During the years of the current five-year plan the USSR Central Statistical Administration in conjunction with the USSR Gosplan, the USSR Ministry of Finance and other ministries and departments have conducted a great deal of work for carrying out this task. In the modern stage it is necessary to continue work for improving accountability, particularly regarding questions of intensifying production and increasing its effectiveness, following the course of economic experiments in various branches of the national economy and monitoring the fulfillment of assignments of the state plan.

At the same time, while taking measures to reduce the management staff and make it less expensive, there have arisen questions of simplifying accounting and accountability in the national economy and, on the basis of this, reducing document turnover. The number of documents that are created and processed in the management staff is not decreasing. It sometimes happens that the ministries and departments introduce reports whose indicators duplicate state

reports; the volume of statistical information gathered and processed in the branch automated control systems is unjustifiably high; the development is not complete for unifies systems and forms of documentation utilized in the national economy, which is necessary in order to simplify and reduce the number of existing documents and also to provide for machine processing of them; the established policy for submitting statistical information is not always observed; and frequently associations, enterprises, institutions and organizations are asked to submit reference materials and reports in excess of the indicators envisioned by the forms of accountability which have been approved by the USSR Central Statistical Administration and the USSR Ministry of Finance.

At a meeting of the Politburo of the CPSU Central Committee on 15 November 1984 General Secretary of the CPSU Central Committee Comrade K. U. Chernenko pointed out that we should "...continue to simplify the administrative staff and to reduce excess accountability and all kinds of red tape."

It is necessary to step up the work for simplifying accounting and reducing the number of reports.

The information base for the entire system of accounting and accountability is the primary accounting in the enterprises and organizations. The interdepartmental and standard forms for primary accounting documentation, which are approved by the USSR Central Statistical Administration and the USSR Ministry of Finance, provide the possibility of optimizing the volume and content, standardizing accounting forms used at the enterprises and organizations, and providing for methodological unity of accounting indicators.

It should be noted that the ministries and departments are not devoting sufficient attention to the organization of primary accounting at the enterprises and in the organizations. Certain ministries and departments have not yet provided for the introduction of standard interdepartmental forms for primary accounting at enterprises under their jurisdiction. A number of ministries have not approved standardized forms.

Many of the shortcomings in the organization of primary accounting, above all the availability and expenditure of material values, are related to the fact that the enterprises and organizations do not have the necessary measurement instruments or containers of standard sizes that correspond to the weighing equipment.

Perfecting and simplifying accountability constitute a most important task. At the present time the accountability and organizations includes state statistical reports which are presented on forms that are approved by the USSR Statistical Administration and the central statistical administrations of the union republics; bookkeeping reports--on forms approved jointly by the USSR Ministry of Finance in the USSR Central Statistical Administration (for kolkhozes--the USSR Central Statistical Administration and the USSR Ministry of Agriculture, and for budget institutions--the USSR Ministry of Finance); departmental statistical reports for which the information is gathered and accumulated in the OASU on forms approved by the ministries and departments of

the union republics; temporary operational reports--on forms approved by the USSR ministers.

State statistical accountability includes interbranch accountability and branch accountability. Interbranch accountability contains general indicators of the activity of the enterprises, organizations and institutions of all or several branches of the national economy. From these, as a rule, one can carry out statistical grouping and aggregation of indicators on the scale of the national economy, particularly for tables of the balance of the national economy. Branch accountability is intended for reflecting the specific peculiarities of the activity of the enterprises and organizations of individual branches, subbranches, ministries and departments.

Additionally, the USSR Central Statistical Administration establishes the so-called unionwide minimum of indicators for the central statistical administrations of the union republics, on the basis of which they approve forms of accountability which take into account the local peculiarities of the national economy and the needs of the republic administrative agencies.

The system of indicators of state statistical accountability is constantly being augmented with indicators which characterize new phenomena and processes of social life which are most essential for the given stage, and at the same time it excludes indicators which have lost their significance and timeliness. This work is systematically carried out by the USSR Central Statistical Administration in close contact with planning agencies, ministries and departments.

Improvement of the system of statistical indicators requires significant methodological developments which rely on the scientific foundation of Marxist-Leninist theory. The USSR Central Statistical Administration and the Scientific Research Institute of the USSR Central Statistical Administration are carrying out a large program of scientific and methodological work in this area.

The development of statistical science and practice in the modern stage is determined by the tasks of improving the society of developed socialism, the decrees of the 26th CPSU Congress and subsequent decisions of the party and government. In keeping with these tasks improvement of the system of indicators of Soviet statistics is currently directed primarily toward deeper and more comprehensive study of the effectiveness of public production and the intensification of the economy, scientific and technical progress, the agro-industrial complex and the implementation of the Food Program, sociodemographic processes and the elevation of the standard of living of the people.

During the years that have passed since the adoption of the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979, "On Improving Planning and Stepping Up the Influence of the Economic Mechanism on Increasing the Effectiveness of Production and Improving the Quality of Work," new indicators have been introduced into accountability: the volume of sales, taking into account the fulfillment of contractual commitments for deliveries, the normative net output, products of the highest quality category, the limit

on the number of workers and employees, the normative of earnings per ruble of output, the limit on capital investments and construction and installation work, the volume of commercial construction output, and so forth.

Recently accountability for industrial and construction has included indicators of the number of workers who are included in the brigade form of organization and stimulation of labor. Beginning in 1985 these indicators were also introduced into accounts for maritime and river transportation, housing and municipal services, and consumer services.

In connection with the large-scale economic experiment that is being conducted in a number of ministries for expanding the rights of production associations (enterprises) in planning and economic activity and for increasing their responsibility for the results of their work, the necessary accounts have been envisioned for enterprises participating in the experiment.

For enterprises of the system of the RSFSR Ministry of Consumer Services that are participating in the experiment, forms have been established for monthly and quarterly reports on the fulfillment of the plan for sales of consumer services that are paid for by the population, and they also have to submit reports fewer times in each period concerning the fulfillment of the plan for production costs and expenditures per ruble of sold consumer services and products as well as reports on the production cost of actually sold consumer services and products according to the calculation items of the expenditures.

Significant tasks ensue from the speech of General Secretary of the CPSU Central Committee, Comrade K. U. Chernenko at the meeting of the Politburo of the CPSU Central Committee on 15 November 1984. It will be necessary to improve the statistical study of such problems as economizing on material resources, utilizing labor efficiently, increasing its productivity, certifying work positions and streamlining them, improving product quality, and introducing the achievements of science and technology into production.

In keeping with the decisions of the October (1984) Plenum of the CPSU Central Committee, the USSR Central Statistical Administration has developed Measures for Further Improving State Statistics in the Area of Land Reclamation, which envision, in particular, improvement of accounting indicators that characterize the activity of irrigation and land reclamation enterprises, the utilization of irrigated and drained land, the availability and introduction of reclaimed land, and the production of agricultural and land reclamation equipment.

During recent years a considerable amount of work has been done to reduce accountability. On the basis of suggestions received from the ministries and departments, this work will be continued in 1985.

An analysis of the experience in this area makes it possible to establish the causes of the appearance and maintenance of an unjustifiably large volume of reports and to determine the main areas for reducing this volume.

One of these causes consists in that the ministries and departments of the USSR when making suggestions concerning the establishment of new reports do

not devote proper attention to discovering and abolishing outdated ones that have lost their significance. As a result, in addition to the new ones they continue to gather information on forms and including indicators which have lost their immediate significance.

Another cause is that the methodology for determining certain planning and reporting indicators is too complicated. Thus the existing methods for planning and evaluating the fulfillment of assignments with respect to the production cost of products has led to a complication and a significant expansion of reporting, particularly the indicators that are not included in the bookkeeping system. If it were simplified it would be possible to reduce the volume of work when preparing these reports to approximately two-thirds the present amount. Another example of this kind is the existing complicated system of forming economic incentive funds which requires a cumbersome system of indicators of the corresponding reports. The USSR Gosplan, the USSR Ministry of Finance and the USSR Central Statistical Administration will have to solve the problem of reducing the quantity of documents that are submitted by the ministries and departments when preparing drafts of plans for economic and social development and the USSR State Budget.

The reduction of reporting in 1985 can proceed along the line of excluding from it forms of duplicating indicators and derived indicators which can be calculated from those which exist in the reports, indicators for various periods when there are running totals, and planning and normative indicators when there are other channels for obtaining them.

Such possibilities are becoming more and more realistic along with the development of automated processing and storage of information in the ASGS's and ASU's of the ministries and departments.

The reporting can be reduced by excluding in certain cases the submitting of the same indicators twice, at different times (for example, by telegraph and by mail) when providing the certification necessary for making management decisions and meeting the deadlines necessary for obtaining the information, by requiring some of the existing reports to be submitted less frequently (for example, quarterly instead of monthly), and by reducing the range of enterprises and organizations that report on individual issues and replacing some of the annual and current (periodic) reports with one-time observations and replacing full-range observations with selective investigations.

Drawing up, submitting, processing and storing reports require considerable expenditures of labor and material resources. The volume of reports significantly affects the load on the administrative and management staff of enterprises and organizations, and also the staff of the management agencies. Therefore a correct determination of the necessary volume of reports, refusal to allow this volume to increase unjustifiably and intelligent reduction of it constitute a crucial task of agencies of state statistics, ministries and departments, in keeping with which in 1985 it will be necessary to revise and approve forms for state statistical reporting for annual reports during 1985 and current reporting for 1986.

State statistical agencies regularly conduct work for standardizing reports. The USSR Central Statistical Administration has developed and the Gostandart approved in 1975 state standards for a unified system of report-statistical documentation (USOSD)--GOST 6.12.1-75 for the basic provisions and GOST 6.12.2-75 for the sample form, in which they have established the general (formal) requirement for reporting: the composition and location of the various parts of the form, the formats of the blank forms, and so forth.

In 1979 the USSR Central Statistical Administration approved the methodological guidelines for standardizing report and statistical documentation, which contain additional (content-related) requirements pertaining to standardization of the forms in terms of the composition of indicators, the comparability of indicators, the introduction of the same names for them, the utilization of unionwide and other classifications and systems of designations, and so forth. The aforementioned GOST's and methodological guidelines reflect the experience that has been accumulated by state statistical agencies, and these documents are being used in the work for standardizing reporting.

At the present time it is necessary to complete the development of standardized systems and forms of documentation and make changes in existing GOST's for USOSD's which are directed, in particular, toward expanding the sphere of effect of standards, reducing the number of sample forms and establishing greater uniformity in them.

One of the directions for content-related standardization of reporting is the creation of forms which would be more convenient to fill out and utilize, which could be adapted for processing by modern computer equipment, and which would save paper when manufacturing the blanks.

Another direction is the introduction of unionwide classifiers of technical and economic information (OK TEI), and also methodological coordination of other classifications and lists of items that are used in state statistics.

Under the conditions of processing statistical information on a computer it becomes especially significant to have stability of the forms of reporting since making changes in them involves the need for adjusting the programs, which entails great expenditures of time and money. A change in the forms requires additional expenditures on publishing them. When the forms were revised in 1984 the changes affected 14 percent of them, including 37 percent of the interbranch and 5 percent of the branch forms. A considerable number of forms will be subjected to changes in 1985 as well.

The creation of accounting and statistical documentation and the reduction of document turnover can and should be promoted by the development of the ASGS, by the higher level of interaction between the ASGS and the OASU, and by the creation of a network of territorial computer centers for state statistics.

Expansion of the work for improving methods of calculation and analysis of statistical indicators in the functional subsystems of the ASGS makes it possible to revise a number of requirements for projecting primary reports and carrying out their unification in terms of content by excluding from them

duplicate and planning indicators, indicators for past periods which can be stored in automated data banks, and also derived indicators which can be obtained through calculation.

During the process of the development of the ASGS we should provide for interaction with such functional subsystems of the OASU's of the ministries and departments which are based on extensive utilization of information as "Accounting and Accountability," "Economic Analysis" and so forth.

The interaction between the ASGS and the OASU should be efficient and directed toward raising the level of the integration of report-statistical information which is gathered in these automated systems and toward the prevention of its duplication. This will make it possible to change over to extensive exchange of data on technical carriers and through communications channels, which will lead to an overall reduction of expenditures on the preparation and processing of data and to an improvement in the quality and efficiency of reporting and statistics. This requires a uniformity of classification and coding of report and statistical information, joint utilization of unionwide classifiers of technical and economic information and the organization of services for maintaining unionwide classifiers at the union, republic and oblast levels of the ASGS on the basis of the network of computer centers of the system of the USSR Central Statistical Administration.

Introducing order and sharply reducing the number of forms and indicators for reporting which are gathered and accumulated in branch automated control systems constitute a crucial task. In the Ministry of Instrument Making, automation equipment and control systems and the Ministry of the Machine Tool and Tool Building Industry the OASU's have relatively small volumes of this kind of information: 10,000-30,000 indicators per year. But many OASU's gather additional information in unjustifiably large volumes which frequently exceed the volume of state reporting. The need for this in order to carry out the basic tasks of the OASU is sometimes extremely questionable. Thus one can consider it superfluous to have daily reports about the commercial and sold products, the number of personnel, labor productivity and so forth (in the USSR Ministry of the Fertilizer Industry and Ministry of the Pulp and Paper Industry--for almost 100 indicators, the Ministry of the Chemical Industry--190, and the Ministry of Agricultural Machine Building--approximately 500). Even larger volumes of information are gathered on a weekly and monthly basis. In this kind of departmental accounting indicators of state statistical accounting are duplicated.

At the present time the USSR Central Statistical Administration in conjunction with the ministries is analyzing the reports and other information gathered and accumulated in the OASU's of the ministries and departments, and it is preparing suggestions for bringing order into this information and reducing its volume.

The document established by the USSR Central Statistical Administration, "The Policy for Establishing Forms for Statistical Reporting of Information Gathered and Accumulated in the OASU's of the Ministries and Departments," formulates a number of provisions directed toward efficient limitation of their volume, but, it is also pointed out that these forms should be

coordinated with the USSR Central Statistical Administration or the central statistical administrations of the union republics (for the ministries and departments under republic jurisdiction), that they should be intended mainly for characterizing specific peculiarities of the production and economic activity of enterprises and organizations of the given ministry (department), and that they should be based on data from primary accounting which is organized in the production associations, enterprises and organizations. The indicators from these reports should not duplicate indicators from state statistical accounting.

Some of the temporary operational reports and the reports established by the ministry are now gathered and accumulated along the lines of the OASU. At the same time in practice there are cases of parallel development of reports within the ministry (in the subdivisions of the central staff, and in the industrial enterprises), and also in the ministries and agencies for state statistics, which leads to additional expenditures. The disclosure and elimination of these parallel developments should be one of the important tasks for the near future.

It is necessary for the information bases of the branch and republic ASU's to be coordinated with the USSR Central Statistical Administration for their statistical data. The corresponding work is being done by the administrations, divisions and Soyuzmashinform of the USSR Central Statistical Administration in conjunction with the ministries and departments of the USSR according to a special schedule.

As for temporary operational reporting, it should be simplified and reduced since in many ministries and departments the volume of this has turned out to be excessively large. Reports that are introduced as temporary operational ones are frequently established without limiting the time period, and they have not been coordinated with tasks for operational intervention into the work of the corresponding enterprises, that is, they do not correspond to its purpose, and they have been in effect for several years.

The "Policy for Establishing Temporary Operational Reporting," which was approved by the USSR Central Statistical Administration, envisioned that temporary operational reporting is established by an order (instructions) from the minister (department manager) on the basis of the need for taking on-the-spot measures to eliminate temporary difficulties that arise in the work of production associations, enterprises and organizations, and the number of these should be at a minimum. This reporting can be introduced for a period of not more than 1 year (otherwise it is included among temporary operational reporting and is established by the USSR Central Statistical Administration--as state statistical reporting of information gathered and accumulated along the line of the OASU) and its indicators should not duplicate the indicators in state reporting.

The time intervals for submitting temporary operational reports are determined by the concrete conditions, but for value indicators (for the volume of sales, commodity output, capital construction, production costs, profit and so forth) these intervals are at least a month or more.

All state, cooperative and public organizations are forbidden to demand, and the managers of enterprises, organizations and institutions are forbidden to draw up and submit postal or telegraphic statistical reports that are not approved by the USSR Central Statistical Administration or the central statistical administrations of the union republics. This policy is frequently not observed despite the fact that the volume, nature and system of indicators of state statistical reporting that is in effect, as practice shows, provides the necessary information to administrative agencies at all levels.

Some of the illegal reports are introduced by middle levels of management (mainly with intervals of a month and more) and they are not necessitated by operational decision-making, and some of them are gathered from the enterprises and organizations by scientific research and planning institutes. Then the indicators duplicate the indicators of existing state statistical reporting to a considerable degree.

Unfortunately, the ministries and departments are not taking the proper measures to reveal and abolish reports that are not approved by the USSR Central Statistical Administration. The orders and instructions they publish regarding this issue are frequently perfunctory in nature and their implementation is not monitored. During an inspection in 1983 of the enterprises of the Ministry of the Machine Tool and Tool-Building Industry it was discovered that, in addition to state statistical reporting, the enterprises of the ministries admit reports not approved by the USSR Central Statistical Administration on arbitrarily established forms with a large number of indicators which largely duplicate state reporting. The ministry gave an instruction to the chiefs of the VPO and the administrations for them to cease demanding reports on forms that are not envisioned by the USSR Central Statistical Administration. But upon a repeat inspection of a number of enterprises of the Ministry of the Machine Tool and Tool-Building Industry in 1984 they again discovered illegal reports which, as before, they sent to the VPO and the institutes.

The reliability of information gathered on the basis of forms that are not approved by the USSR Central Statistical Administration is very poor, as a result of which it is difficult to use. But compiling these forms involves considerable expenditures of the labor of accounting workers and in some cases also of engineering and technical personnel. Illegal accounting has justifiably evoked complaints from enterprises and organizations and its elimination will make it possible to considerably reduce document turnover.

Obviously it is necessary to take additional measures to provide for the observance of the established policy for presenting statistical information.

Conducting work to improve accounting, to simplify it and to reduce the quantity should provide for obtaining all the statistical information necessary for purposes of management and planning.

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## ECONOMIC MODELING AND COMPUTER TECHNOLOGY APPLICATION

### METHODOLOGY OF SETTING UP INVESTMENT COMPLEX MODEL ANALYZED

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA EKONOMICHESKAYA in Russian No 2,  
Mar-Apr 85 pp 48-57

[Article by G. B. Sychev: "Methodological Aspects of the Modeling of the Investment Complex"]

[Text] The article considers certain approaches to the modeling of the development of the investment complex which make it possible, in the process of developing forecasts, to guarantee the balancing of the national-economic and branch needs for capital investments and the opportunities for their material-substantive filling. A special place in the system of the interrelationships that are being studied is given to machine-building, as the branch that materializes in the machinery and equipment being produced by it the achievements of NTP [scientific-technical progress].

At the 26th CPSU Congress and the subsequent Plenums of the party's Central Committee, an exceptionally large amount of importance was attached to questions of administering the national economy. At the December 1983 Plenum of the CPSU Central Committee, it was especially emphasized that the constant improvement of the existing forms and the creation of new forms of administering and planning the national economy, which are adequate to the level of development of the productive forces and the nature of the tasks to be resolved, is a necessary condition for the most complete use of the advantages that are contained in the socialist method of production [1, p 22].

Under conditions of the intensification of the target-directedness of economic development and the increasing complexity of the economic interrelationships, an area that is being an important one in improving the administration of social production is the planning of the national economy not as the totality of individual branches, but as the totality of complexes of branches that are united on the basis of their functional purpose. The experience of macroeconomic forecasting demonstrates the desirability of isolating such national-economic complexes as the investment complex, the fuel and energy complex, the agro-industrial complex, and the complex of branches of the production infrastructure. This approach to the planning of the national economy, as compared with the traditional one, makes it possible: 1) to determine the limitations in the achievement of the target goals of social development on the part of the basic national-economic resources that are to be produced by each complex (investment,

raw-material, food-and-energy, foodstuffs, etc.); 2) to substantiate the efficient proportions among the branches within the confines of the complex in conformity with its tasks of guaranteeing the needs of the national economy for the resources to be produced by the complex; and 3) to determine the bottlenecks in the development of the branches in the complex; and to evaluate more completely the contribution made by each of the branches in the complex to the final national-economic result.

The investment complex represents the totality of the branches whose functional purpose is the providing of social production with investment resources (machinery, equipment, structural materials), as well as the creation of fixed production assets, the activation of production capacities on the basis of the technical re-equipping and expansion of the country's production apparatus, and the raising of its technical level. It includes machine-building and metal-working, ferrous and nonferrous metallurgy, the building-materials industry, the timber, woodworking, and woodpulp-and-paper industry, branches of chemistry that are specialized in the production of synthetic materials, and construction.

During the period of the changeover to the intensive path of development, the national economy is faced with the acute problems of the interbranch balancing and the acceleration of the structural shifts in the sphere of the production and use of structural materials, and the bringing into qualitative conformity of the new substantive elements of production and the organizational-economic conditions of its functioning which have developed. This, naturally, has a reflection both upon the peculiarities and conditions of the reproduction of the investment resources by the branches of the complex, and upon the nature of the contribution made by those resources to the national-economic dynamics. It is well known, for example, that in the second half of the 1970's one observed the formation of tendencies toward the reduction in the growth rates of the overall volumes of production capital investments, to the intensification of the limitations on the part of the primary investment resources, to the slowing down of the dynamics of activation of production capacities with the simultaneous increase in the assets-intensity and capital-intensity, to the slowing down of the process of the renovation of the production apparatus of the branches, etc.

The overcoming of tendencies such as these will be the basis of guaranteeing by the investment complex the dynamic development of the material-technical base of social production, and this, in its turn, will promote the achievement of stable high rates of economic growth. The development of the investment complex must also compensate for the reduction in the growth rates of the labor, natural, and other resources to be involved in production, by improving the quality and raising the technical level of the investment resources to be reproduced by the complex, and also the quantitative increase of their volume.

In this regard the investment complex is confronted by the following basic tasks: 1) the increase in the investment potential of the economy under the conditions of moderate growth rates for capital investments on the basis of the slowing down of the increase in the assets-intensity and capital-intensity of the capacities to be activated, the overcoming of the shortage and structural disbalance of structural materials, the improvement of the organizational structure of the branches of the investment complex, and

primarily machine-building and construction; 2) the guaranteeing of the necessary structural shifts in the national economy by means of the improvement of the structure of the production and shipments of equipment, and the raising of its technical level; 3) the raising of the technical level of the country's production apparatus on the basis of the acceleration of the renovation of the production apparatus of the branches in the investment complex and the increasing of the mobility of machine-building; 4) the reduction of the investment cycles, and especially the duration of construction; 5) the reinforcement of the material-technical base of the branches that produce structural materials, with the simultaneous reduction of the load placed upon those branches, by means of the constant shifting of it to machine-building on the basis of increasing the reliability, durability, and other features characterizing the technical level of the machinery and equipment, the reduction of their materials-intensity, and the introduction of technological schemes that economize on resources.

Under conditions of the complicated system of interrelationships among the branches of the investment complex and the branches of the national economy, the limited nature of all types of resources, and the existence of a large number of alternatives for distributing them, the most effective resolution of these tasks is impossible without preliminary forecasting-analysis computations. These computations require the corresponding model, which would encompass the process of the interreaction that the investment complex has with the dynamics and structure of the social production and that would open up the opportunity for its quantitative evaluation and the administration of it.

The development of such a model stipulates: the description of the process of reproduction of the investment resources, its influence upon the rates and proportions of economic development; the forecasting of the national-economic dynamics and structure with the various alternatives of the investment policy; the evaluation of the ability of the investment complex to provide with the necessary resources the different alternatives of economic development, with a consideration of the factors of scientific-technical progress; the isolation of the guiding parameters for economic growth that lie in the area of the reproduction of the investment resources. The sequence of the computations to substantiate the extent to which there is resource support for the macroeconomic forecasts of the development of the national economy, which are to be carried out within the confines of the model, is reflected in the diagram [on the next page].

The development of the model of the investment complex requires, first of all, the resolution of a number of methodological questions, such as: the linkage of the model of the complex, at its inputs and outputs, with the macroeconomic national-economic models, particularly with such a modification of the interbranch balance sheet as the model of the interbranch interactions [2]; the generalization of the branch scientific-technical forecasts and the inclusion of their results in the model developments; the qualitative evaluation of the space-and-time interrelationships among the branches in the complex; the combination of endogenous and exogenous information to be used to evaluate the parameters of the model and to carry out the computations; the selection of the type of mathematical dependencies in order to describe the interrelationships in the complex (balance-sheet, econometric); the comparability of various types of prices when changing over from one block of the model to another (for

example, foreign-trade prices of equipment and the domestic prices of production, etc.); the limited nature of the statistical data that characterizes the various aspects of the investment process (for example, the capacities of the construction organizations, the volumes of cooperative-type deliveries in machine-building, etc.); the combination of settlements within the confines of the "pure" and economic branches of machine-building, as well as the machine-building ministries; and the coordination of the branch view of computations with the computations within the confines of the national-economic complexes.

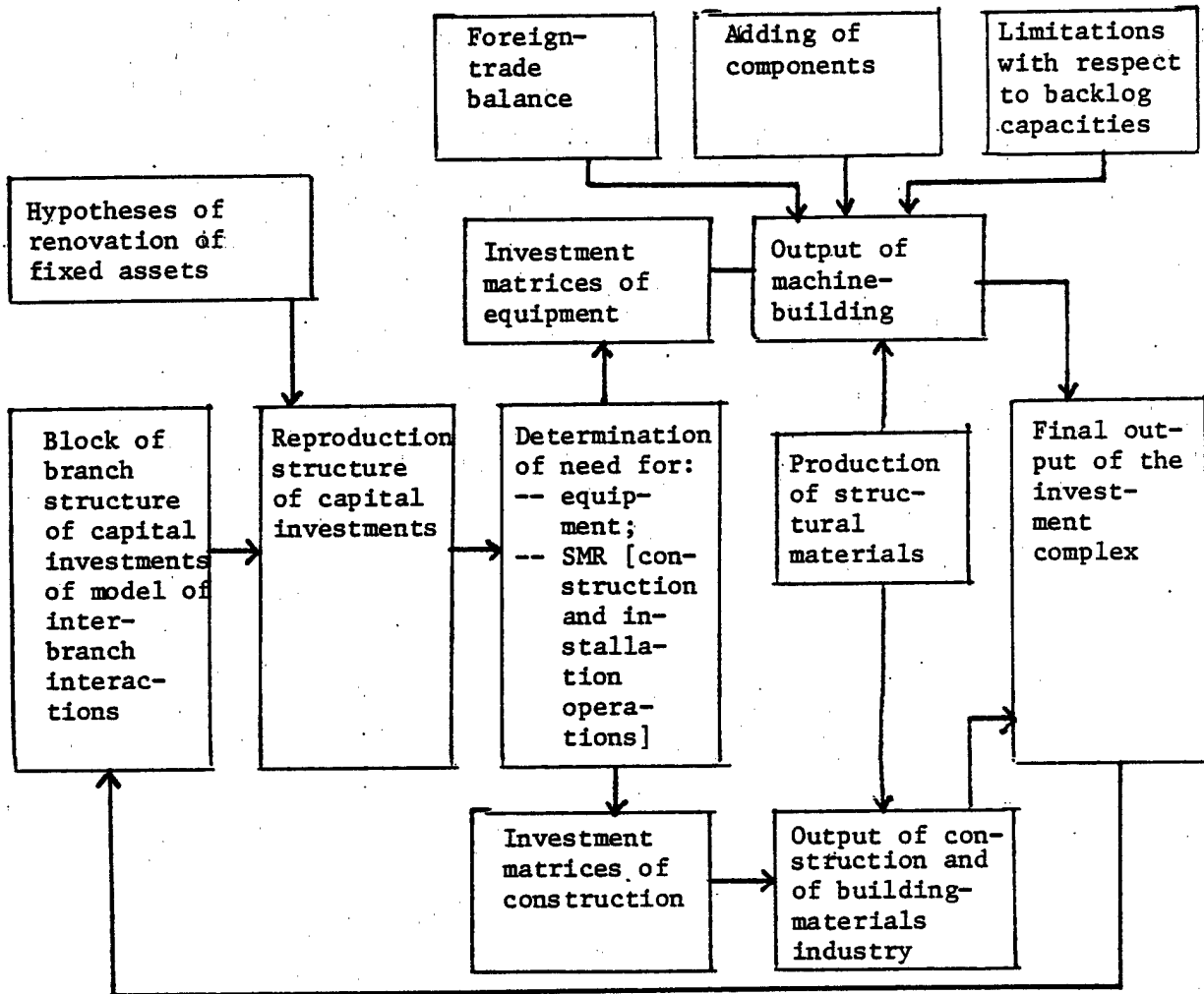


Diagram for computations to substantiate the provision of resources for forecasts of national-economic development (within the confines of the model of the investment complex)

A central place in the system of the interrelationships in the investment complex which are being modeled is given to the proportions among machine-building, construction, and other branches of the complex and the national economy. This priority nature of machine-building and construction is determined by their leading role in the creation of the final output of the investment complex -- the activation of new production capacities and fixed assets, and the maintaining of the existing ones. Under the conditions of the

resource limitation, the dynamics of the economy depends more than ever upon the speed with which those branches will create the material prerequisites both for the intensification of the use of all types of resources, and for the quantitative increase in the production of the primary investment resources.

It is necessary to note the following fundamental factors in the interaction between machine-building and construction in the investment process. Whereas the entire final output of construction is materialized in the assets to be activated, only part of the final output of machine-building is directly transformed into fixed assets in the form of the equipment that is not included in the construction-project estimates (the so-called mobile-technology group -- rail and motor transport, construction and agricultural machinery, etc.). At the same time the cost of the equipment and machinery (with drive devices) constitutes the majority of the cost of the production-purpose projects to be activated. The bulk of the final output of machine-building is transformed into assets only by means of construction. Therein consists the dialectical unity and contrast of the interaction between these branches within the confines of the investment process: the achievements of scientific-technical progress which are to be embodied first of all in the new technology cannot become the property of production without the construction of buildings in which the equipment will be housed. Putting it another way, there is a time lag, the inevitable delay in the introduction of anything new into the national economy. At the same time, construction, by creating the fixed assets of machine-building, is in its turn the resource base of scientific-technical progress in the production of machinery and equipment.

Therefore the determination of the need for the output of machine-building and construction is the central point in developing the forecast of the resource support of social production.

The initial point for computing the national-economic need for the basic types of investments -- equipment and construction-and-installation operations (SMR) -- is the branch structure of capital investments, which is determined on the basis of the investment-assets block of the dynamic model of the inter-branch interactions. This structure reflects the need of the branches for volumes of capital investments to implement a particular forecast alternative in the development of the national economy. The computations are carried out for 18 branches of material production, including 14 branches of industry, and also for construction, agriculture, transportation and communication, trade, and public nutrition.

The changeover from gross capital investments to the need for equipment and construction-and-installation operations is carried out on the basis of the blocks for reproduction and technological structure of capital investments [3]. In the block for reproduction structure one carries out the distribution of the capital investments among the basic areas of reproduction of assets, which vary by the degree of intensity of that process. The first area includes chiefly the intensive forms of reproduction -- remodeling, technical re-equipping, maintenance of capacities; the second, chiefly the extensive forms -- expansion, new construction; and the third, other (equipment that is not included in the construction-project estimates, design and exploratory operations).

A fundamental peculiarity of the formation of the reproduction structure within the confines of the model being considered (see diagram) is its coordination with the hypotheses of renovation of the fixed production assets in the long-term period, which are being developed on the basis of: the analysis of the branch forecasts of the level of the actual wear and tear and obsolescence of the fixed assets and their service lives; the socioeconomic motives for renovation in the various branches and their priority status; and limitations on the increase of fixed assets, including those on the part of providing labor resources for the new work stations.

On the basis of exogenous information concerning the technological structure of capital investments, for each reproduction area one carries out the final determination of the needs of the branches of the national economy, and material production as a whole, for equipment and construction-and-installation operations. Thus there is a distribution of the load between the basic assets-creating branches -- machine-building and construction.

The long-range proportions between capital investments in equipment and construction-and-installation operations are determined by proceeding from self-contained branch forecasts, with a consideration of the following factors: the intrabranh distribution of investments in favor of progressive technological schemes, the capital investments in which are distinguished by a higher share of equipment therein; the dynamics of the import of equipment, as a rule, that is more expensive per unit of productivity as compared with domestic equipment; and the development of the processes of the mechanization and automation of production, which make an increased demand upon the equipment.

The forecast of the branch needs for expenditures for equipment and construction-and-installation operations is the initial information for determining the need for investment shipments of equipment to the branches of the national economy, and also for the corresponding volumes of construction output. The computation of the material-substantive providing of investment resources for the expenditures for equipment and construction-and-installation operations is carried out in the block of the physical-substantive structure of capital investments.

The level of aggregation of the computations of the physical-substantive structure of capital investments for equipment is determined by the number of items in the subbranches of machine-building that are assumed at the present time when planning the production of machine-building output and that reflect the degree of the existing specialization of objects. That level, which comes to 40 different types of equipment, does not always make it possible to reflect with sufficient completeness the shifts to be determined by the changes in the technological schemes in the branches. Therefore work is being carried out on a model that encompasses 90 different types of equipment. Similarly, the investment matrices in the United States were originally developed for 25 products, and then were additionally deaggregated to 79 products.

The investment matrices of equipment constitute the basis of the modeling of the physical-substantive structure of capital investments in equipment. The matrix line represents the physical-substantive structure of the capital investments in equipment for the specific consumer-branch  $i$  ( $i = 1.18$ ),

and the column represents the structure of the interbranch distribution of the resources of the equipment of the specific type  $j$  ( $j = 1.40$ ). The long-term computations are carried out for the period of four five-year plans with a consideration of the current five-year plan and the report five-year plan, that is, for  $t = 1.6$ . The following indicators are used:  $IE_i$  -- capital investments for the acquisition of equipment in the branches of material production;  $d_{ij}$  -- structure of investment shipments of equipment types  $j$  into branch  $i$ ;  $SEI_k$  -- foreign-trade balance for equipment that pertains to the nomenclature of production of machine-construction branch  $k$ ,  $k = 1.11$ ;  $C_k$  -- limitations on the part of the backlog capacities for production of output by branch  $k$  for the average-period long-term view;  $R_{k(I,L,M)}^*$  -- the exogenously determined resources of capital investments, labor, and metal;  $dR_{k(I,L,M)}$  -- the specific expenditures of resources for the production of output in branch  $k$ .

In the model, the following indicators are successively computed:  $IE_{ij}$  -- investment shipments of equipment type  $j$  to branch  $i$ ;  $IE_j$  -- national-economic need of equipment type  $j$ ;  $P_k$  -- production of output by machine-building branch  $k$ ;  $R_{k(I,L,M)}$  -- need for resources necessary to guarantee  $P_k$ .

The indicators are intercorrelated into a system of equations:

$$IE_{ijt} = d_{ijt} IE_{it}; \quad (1)$$

$$IE_{jt} = \sum_i IE_{ijt}; \quad (2)$$

$$P_{kt} = f \left( \sum_{j \in J_k} IE_{jt}, SEI_{kt}, \phi_t \right); \quad (3)$$

$$P_{kt} \leq C_{kt}; \quad (4)$$

$$P_t = \sum_k P_{kt}; \quad (5)$$

$$R_{kt(I,L,M)} = dR_{kt(I,L,M)} P_{kt}; \quad (6)$$

$$R_{t(I,L,M)} = \sum_k^{11} R_{kt(I,L,M)}; \quad (7)$$

$$R_{t(I,L,M)} \leq R_{t(I,L,M)}^*, \quad (8)$$

where  $J_k$  is the group of equipment types that pertain to the nomenclature of production in branch  $k$ ; and  $\phi_t$  is the time function.

In the event of nonobservance of inequalities (4) and (8), one carries out iterative computations in order to achieve the balanced state of the national-economic needs for investment shipments of equipment with the capabilities of machine-building. For that purpose one carries out, on the one hand, the redistribution of capital investments in favor of the priority branches of the national economy and the search for less capital-intensive areas for their development at the expense of the factors of scientific-technical progress, and the needs for investments are limited. On the other hand, one searches for the opportunities to satisfy the needs of the branches for equipment at the expense of increasing the mobility of machine-building: the improvement of the use of its production apparatus, the technical re-equipping of the branch, the reduction of the duration of construction of machine-building capacities, etc. An important factor for guaranteeing the national-economic needs for equipment is the policy in the area of import.

In order to characterize the dynamics of the change in the structure of the investment shipments of equipment into the branches of the national economy, one uses the indicator of structural shifts:

$$K = 0.5 \sum_{j=1}^{40} \left| d_{ijt} - d_{ij(t-1)} \right|. \quad (9)$$

The closer that indicator  $K$  is to 100%, the more dynamic the structure is; and the closer it is to zero, the more inert it is. For the 1971-1975 period, the values of  $K$  constitute [5, p. 79]:

1971-1975	1976-1980	1981-1985 (plan)
5.1	6.0	6.1

The key factor in modeling the physical-substantive structure of capital investments in equipment is the development of the matrices of its investment shipments  $\sum_{i=1}^{18} \sum_{j=1}^{40} d_{ijt}$  ( $t = \overline{1,6}$ ). The forecast matrices are developed on the basis of the analysis of the regularities and tendencies in the change in the structure of shipments during the report period, and the consideration of the long-range ships in the intrabranh structure of capital investments in the equipment-consumer branches under the influence of the scientific-technical progress.

The changeover from the needs for investment shipments of equipment  $IE_{ijt}$  to the long-term production of output of machine-building  $P_{kt}$  that is necessary to guarantee the forecast values of the shipments, is carried out on the basis of econometric equations of type (3). The use of econometric dependencies is determined by the absence, for many types of equipment, of partial material balance sheets expressed in value terms, and the statistics pertaining to the

intrabranh processes of making up complete sets of output of machine-building, and also by the complexities of converting the foreign-trade prices to domestic ones. Thus, the need for the output of instrument-building is described by the following equation (in parentheses, standard errors of parameters):

$$P_{kt} = 7971.5 + 0.3627IE_{ij} - 3.6350IE_{kt} - \frac{75335.8}{t + 10}.$$

(983.3)      (0.1533)      (2.6423)      (9716.6)

The forecast for the need for the output of machine-building is developed with a consideration of the limitations on its production on the part of metal, labor resources, capital investments, and other types of resources to be determined on the basis of the branch forecasts of labor productivity, and the metal-intensity, capital-intensity, and assets-intensity of the machine-building industry.

Other factors that substantially limit the carrying out of long-term shifts in the structure of the output of machine-building and its capacities are the volume, structure, and degree of readiness of the construction backlogs in the branch as a consequence of the inertness of the construction programs in machine-building. Studies indicate that the backlog capacities in machine-building predetermine the growth and structural shifts in the production of machine-building output within the confines of the average-duration long-term period [4]. With a consideration of the volumes of backlog construction, the amounts of withdrawal of capacities, their increase (or decrease) as a result of a change in the nomenclature of output, and the level of their use, one determines the possible volume of production  $P_{kt}^*$  during the forecast period.

In the event of inequality  $P_{kt}^* < P_{kt}$  one carries out the iterative coordination of  $P_{kt}^*$  and  $P_{kt}$ , which lies in the search for ways to increase the activation of capacities from the existing backlogs (by means of the acceleration of the construction periods), and also by improving the use of the capacities. In its turn, the duration of the creation of the capacities in the branches of machine-building is expressed in the form of the econometric dependencies of the duration of construction  $\tau$  (in terms of one unit of capacity to be constructed) upon such factors as the concentration of capital investments in the projects in the branch which are under construction ( $X_1$ ), the technological structure of the capital investments (the share in them of the construction-and-installation operations --  $X_2$ ), the size of the enterprises that are under construction ( $X_3$ ), the capital-intensity of the capacities to be activated ( $X_4$ ), and the ratio between the in-house and contract methods of construction ( $X_5$ ). Thus, for heavy and transport machine-building the equation of multiple regression has the following form:

$$\tau = 0.1400X_1^{-1} - 0.1732X_2^{-1} - 7.9121X_3^{-1} - 0.0326X_4^{-1} + 0.3824X_5 + 0.0435$$

(0.0213)      (0.1161)      (0.6559)      (0.0430)      (0.1320)

$$V = 0.24; R^2 = 0.81.$$

The equations given made it possible to determine the reserves for reducing the duration of construction in machine-building by means of the positive change of the factors  $X_1, \dots, X_5$ . As a whole, in the branches of machine-building, there is the opportunity for a substantial reduction in the time periods for creation of capacities to one-third to one-half, or even a greater reduction [5]. Approximately 50 percent of that reduction is the share of the factor for increasing the concentration of capital investments; 20-25 percent, for the optimizing of the sizes of the enterprises to be constructed; 15-20 percent, for the improvement of the technological structure of the capital investments; and 10 percent for the reduction of the capital-intensity of the capacities to be created and the improvement of the methods of fulfilling the operations.

The accounting of the construction backlogs in machine-building makes it possible to reflect one aspect of the interaction among the processes of construction and production of equipment, and the interdependency in time between the formation of the need for equipment and the need for construction-and-installation operations. Another, no less important, aspect is the creation by construction of fixed assets in the remaining branches of the national economy, their "liability" part, in combination with which the consumer properties of the equipment being produced and being imported are completely realized; the volume and rates of shipments of technology must be intercoordinated with the volumes and rates of production construction. To a considerable degree the resolution of this problem will be promoted by the combining of the investment matrices of equipment and construction in the model elaborations that are being used.

The experience of forecast computations according to the model of the investment complex demonstrates the need to improve it in the direction of the more complete reflection of the influence exerted by the factors of scientific-technical progress upon the proportions of economic development. Among them one must include the changes in the technological schemes of production that result in shifts in the physical-substantive structure of investments and that make new demands on the quality and technical level of the output of branches in the investment complex, and also the quality of the resources to be involved, especially the labor resources. A question that has been insufficiently worked out is the question of the influence of the improvement of the use of the production apparatus of the complex upon raising the resource support of the social production.

As a whole the proposed approaches to the modeling of the investment complex made it possible to refine the degree of investment-resource support of the planned tasks for long-term socioeconomic development, as well as the large-scale national-economic programs: the Food Program, the Energy Program, etc. For that purpose one determined the needs of the branches and the national-economic complexes for equipment, construction-and-installation operations, metal, and labor resources (on the basis of the branch scientific-technical forecasts), which needs were coordinated with the opportunities of the investment complex for building up the production of investment resources with a consideration of the expected economizing of them.

The long-term need for investment resources in the fuel and energy complex is determined by the reorganization of our country's energy balance sheet, by the increase in that balance sheet of the share of gas, coal, and nuclear energy, and by the decrease in the percentage of petroleum. In this regard there must be an outstripping increase in the production and shipments of equipment for nuclear electric-power plants as compared with the increase in the overall volume of capital investments in equipment for the branches of the fuel and energy complex.

The broad development of nuclear power engineering in the European part of the USSR, and the construction in Siberia of complexes of thermal-electric power plants on the basis of deposits of low-grade coal varieties, influence the high rates of growth in shipments of turbines, boilers, and boilerroom equipment. The dominant tendency at such time is the increase in the unit capacity of the turbines for nuclear and thermal-electric power plants. It is expected that scientific-technical progress in boiler-building (the introduction of small-sized boilers with vortex furnaces, boilers with the combustion of fuel in a low-temperature boiling layer, etc.) will guarantee the lowering of the specific metal expenditures for the creation of boiler equipment by 30-40 percent, will increase the thermal economy of the units by 10-15 percent, and will reduce the periods of time required to install them by approximately one-half.

The tendency toward the further increase in the share of the open-pit method of extracting coal, ore, and other mineral raw materials in the overall volume of their production determines a substantial change in the structure of shipments of mining technology at the expense of the outstripping rates of production and shipments of quarry technology as compared with mining technology: excavators with a shovel capacity of four cubic meters or more, heavy bulldozers, and quarry dump trucks and truck trains with high carrying capacity. It is important not simply to expand the production of the models of machinery that are currently being produced, but to create new ones, including systems of mining machinery to develop the large coal seams, and to raise the technical level and improve the quality of the equipment. The involvement in development of large volumes of low-grade coal varieties is giving machine-building the task of producing equipment for processing them into enriched solid, liquid, and gaseous types of fuel and into chemical raw materials.

The worsening of the petroleum-drilling conditions, the need for the more complete extraction of petroleum from the seams and the more complete refinement of it determine the outstripping increase -- as compared with the increase of investments in equipment for the TEK [thermal-electric complexes] -- in the shipments of drilling technology, petroleum apparatus, and equipment for the extraction of petroleum of the sea and ocean shelves. For that purpose, machine-building must set up the production of equipment that guarantees the increase in the petroleum yield of the seams to 55-60 percent, the increase in the drilling depth to 6.5 kilometers, and an increase in the drilling speed by a factor of 2-3.

The change in the structure of the shipments of equipment to the investment complex is influenced by the need for its accelerated development with the purpose of expanding the investment capabilities of the economy, raising the technical level of the country's production apparatus, and shifting the work load from the branches that produce structural elements to machine-building.

The acceleration of the shipments of metallurgical equipment is caused by the need for the intensification of ferrous metallurgy, the reinforcement of its production base for purposes of the outstripping improvement of quality and the improvement of the variety of metal as compared to an increase in its production. This presupposes the outstripping rates of growth in the production and shipments of equipment for the fourth and subsequent metallurgical process stages as compared to blast-furnace and steel-smelting, as well as coke, equipment. In the long-term view, in addition to the improvement of the structure of production and shipments of metallurgical equipment, it is necessary to guarantee a raising of its technical level and an improvement of its quality (for example, cold-rolling mills with the maximum weight of roller, speed of rolling, and other parameters), and to assimilate the production of highly effective equipment for producing progressive types of metal output and the broad application of advanced technological processes: arc electric furnaces with superhigh-capacity transformers; equipment for processing the metal outside the furnaces; exhausters for high-productivity agglomeration; etc.).

Profound shifts in the structure of shipments of metal-processing equipment to the investment complex are caused by changes in the technological schemes being employed, in the direction of an increase in the effectiveness of the use of material resources, especially metal (increase in cutting speed; the application of cutting tools made of synthetic diamonds; plasma processing of metals; spraying of powders). The need to increase the effectiveness of the use of labor resources and to resolve the problem of skilled labor determines the broad spread of machine tools with operational control systems, and of flexible production systems, the creation of completely automated production entities with the minimal number of maintenance personnel, and the mass application of industrial robots. The return on independently functioning machine tools with ChPU [digital program control] is considerably increased when they are combined with industrial robots and means of computer technology into flexible automated production entities (GAP). The introduction of flexible automated production entities for the mechanical processing of complicated body parts makes it possible to increase labor productivity by a factor of 2-2.5 and to increase the return on assets by 15-20 percent.

The resolution of the tasks of the technical re-equipping of construction that are linked with the need to speed up the activation of fixed assets and the production capacities, and to reduce their estimated cost, requires the carrying out of the complete mechanization of construction operations, especially remodeling and technical re-equipping, in which the share of manual labor is the highest. Therefore it is necessary to increase the production and shipments of equipment that guarantees the broad introduction of especially effective labor-saving and material-saving technological schemes in construction (conveyor-unit method of installation, moveable sheathing, etc.), as well as progressive construction materials (steel and glued wooden structurals, laminated panels with heater, etc.).

Shipments of equipment to the agroindustrial complex have been called upon to guarantee the priority development of the branches dealing with the transporting, storage, and processing of agricultural output; it is necessary to have an outstripping rate of growth in the shipments of trucks and trailers for them, refrigeration equipment, technological equipment for light and food

industry. In the long-term view it will be necessary to slow down the production and shipments of tractors and agricultural machinery while carrying out their qualitative improvement. The structure of production and shipments of agricultural technology needs further improvement in the direction of creating complexes of technologically interrelated machinery for the cultivation and harvesting of industrial crops, potatoes, vegetables, etc. That will result in a lowering of the production and shipments of machinery to harvest grain crops (combines, reapers), and also of soil-cultivation technology.

Shipments of hoisting and transporting equipment have been called upon to assure the completion of the comprehensive mechanization of the loading-and-unloading and warehouse operations in the branches of the national economy. This will promote the considerable freeing of workers who are engaged in heavy and unattractive labor. The resolution of this task in the long-term view will require a substantial change in the structure of the backlog capacities for the production of hoisting and transporting equipment, in the direction of an increase in the proportion of loaders, stackers, and other analogous types of machinery, with a reduction in the share of hoisting cranes, conveyor belts, and other equipment whose buildup of production does not resolve the problem of mechanizing the most labor-intensive operations (loading-and-unloading, warehouse, etc.).

The need to complete, within the long-term view, the automation of the basic technological processes and administrative labor in all branches of the national economy will determine a considerable increase in the shipments of instruments and means of automation and computer technology.

The implementation of the basic tasks of scientific-technical progress in the national economy, which is embodied in tools of labor, will cause, in the long-term view, a considerable increase in the load placed upon machine-building, and the increase in the need for capital investments in the production of tools of labor, together with their substantial redistribution. This already requires the careful substantiation of the priority areas of investment in machine-building: it is specifically on this path that it is possible to achieve the accelerated development of the branch (a development that occurs under conditions of the limitation of resources, inevitably at the expense of certain other branches), which will guarantee subsequently the more rapid development of the entire national economy. One would think that the considered approach to the forecasting of the development of the investment complex will aid, to one degree or another, the resolution of the problems of substantiating the investment policy in the area of social production for the long-term view.

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GENERAL

GOSSTANDART INTRODUCES NEW MEASURES TO IMPROVE QUALITY

Measures for Improving Quality of Goods

Moscow EKONOMICHESKAYA GAZETA in Russian No 14, Apr 85 p 7

/Article by I. Isayev, deputy chairman of USSR Gosstandart: "Standards In Behalf of Quality"/

/Text/ One of the principal tasks of industry is that of raising the quality of consumer goods and improving their consumer properties.

The concentration of the efforts of Gosstandart, ministries and departments on the problems concerned with quality and the introduction of new state standards which take into account the modern achievements of science and engineering have made it possible in particular, during the past year, to master the production of an entire series of products which meet the needs of very demanding purchasers.

Especially deserving of mention is the work performed by the collectives at the Moscow Vtoroy Chasovoy Zavod Production Association, the Baku plant for household air conditioners, the Vilnyus Fur Production Association, the Kostroma and Pyarnu flax combines, the Tallinn PShO imeni V. Klementi and the Frunze Sewing Factory 40 Let Oktyabrya. Naturally, the positive trends in the production of good quality and handsome clothing, footwear, objects of economic use and cultural-domestic products are clearly manifested mainly at those enterprises where a systematic approach is being employed for the problem of quality and where use is being made of KSUKP's /kompleksnaya sistema upravleniya kachestvom produktsii; complete system for controlling output quality/.

From a KSUKP To Programs for Quality

It was not too long ago that systematic work aimed at improving the quality of products was carried out only at individual enterprises. Each collective conducted such work on an independent basis. The systems which came into being at enterprises in Saratov, Gorkiy, Yaroslavl and other cities are recalled. There was a great amount of confusion and misunderstanding on the part of other enterprises in mastering these systems. Workers at Lvov succeeded in mastering the positive features contained in these regional systems for raising output quality and in developing a KSUKP based upon the enterprise's

standards. This experience was approved by the CPSU Central Committee and recommended for introduction on an extensive scale.

Today the KSUKP is being employed at more than 30,000 industrial enterprises, including at 2,000 enterprises of USSR Minlegprom /Ministry of Light Industry/ and 4,000 enterprises of USSR Minpishcheprom /Ministry of the Food Industry/. And this is producing results. In those areas where the KSUKP is functioning in an efficient manner, the quality of the output is noticeably higher.

Fine initiative has been displayed in Tula Oblast. As a result of systematic work directed towards raising output quality, introducing use of the KSUKP and attracting workers to participate in production control operations, the Tula workers are completing the development of a program entitled "Quality." It encompasses 380 industrial enterprises and planning-design organizations, 20 rayons throughout the oblast and the city of Tula. The program is making it possible in actual practice to achieve a combination of branch and territorial control over quality. The carrying out of this program will make it possible to increase the production of high quality products, including goods for the people, from 52.9 percent in 1985 to 75.5 percent in 1990.

Programs for all-round standardization are proving to be of considerable benefit. The periodic press has contained a number of articles on the use of PKS's /programma kompleksnaya standartizatsiya; program for all-round standardization/ throughout the country, such as Obuv'" and a number of others; the PKS's "Moloko and "Milk Products for Children's Nourishment" have been approved for operation. Although I will not be able to discuss all of the PKS's, I nevertheless will mention the PKS "Knitted Goods." Others have developed or are being developed in keeping with this same principle.

This PKS was approved by Tosstandart at the beginning of the 11th Five-Year Plan. The principal goal of the program -- improving the quality of knitted goods, expanding their assortment and satisfying the requirements of the population for high quality clothing. The PKS calls for the development and implementation of a sound complex of normative documents for bringing about an improvement in the quality of knitted goods. This can be accomplished only if mutually coordinated requirements are established with regard to the final products and also the raw materials, other materials, technical means of production and control equipment.

This requires the development, examination, extension (including with changes and supplements) and the placing in operation, prior to the end of the current year, of 136 documents: 64 state standards, 41 branch standards, 23 technical conditions and other documents.

Specialists attached to the knitted goods industry developed more than one half of these normative-technical documents and the remaining ones -- developed by allied workers.

Over the past 2 years, the implementation of the tasks set forth in the program for all-round standardization has brought about an increase in the production of 1st grade products throughout the branch. A computation based upon wholesale prices revealed a national economic effect of approximately 6 million rubles.

In the interest of stimulating a campaign aimed at improving quality, the AUCCTU and Gosstandart instituted the diploma entitled "For Achieving the Best Results in the Production of High Quality Products." Each year they are awarded to dozens of leading collectives.

At the same time, the rates for raising the technical level and the quality of the products are still not satisfying completely the increasing requirements of the population. The trade is still being supplied with goods for which there is no market, goods which tend to remain for extended periods of time in wholesale warehouses and stores. And the chief barrier in the path of such products being delivered to counters is the service being performed by the OTK's /Department of Technical Control/ of enterprises.

#### Potential of the OTK's Has Increased

Five years ago the USSR Council of Ministers approved the standard statute for an OTK, which extended great rights to workers attached to technical control services. The enterprises often refer to negligent suppliers by insisting that they supply low quality raw materials and other materials and also low quality component parts. Truly, this occurs quite often. But indeed the OTK workers are authorized to issue reports stating that allied workers supplied low quality materials, raw materials and parts. Such reports are sent to the territorial organs of Gosstandart and the USSR Procurator's Office where the supplier is located, with all of the attendant consequences. Thus the OTK service of enterprises and departmental control can and must be primarily responsible for monitoring the quality of the products being produced. As workers attached to Gosstandart, we carry out checks to ensure that the products being produced conform to the normative-technical documentation and also on the efficient organization of technical control.

There is still one other aspect worthy of mention. In accordance with the statute on OTK's, the ministries were authorized to remove the chiefs of OTK services from subordination to the director of plants and to make them directly subordinate to their chief inspection for quality. But the ministries are utilizing this right in a very timid manner. In 1983, only Mintyazhmash /Ministry of Heavy and Transport Machine Building/ handed down a decision concerning the resubordination of OTK chiefs at their enterprises in Leningrad. The operational experience in connection with this new method has produced positive results. On 1 January of this year, Minstroydormash /Ministry of Construction, Road and Municipal Machine Building/ subordinated the OTK services at all of its industrial enterprises to the chief of the ministry's Chief Inspection for Quality.

Last year, Gosstandart carried out approximately 10,000 checks on observance of the standards and on the quality of consumer goods. This included such goods of extended use as tape recorders, motorcycles, bicycles, cameras, washing machines, household electrical appliances and many other items.

Workers attached to Gosnadzor in the various areas uncovered incidents which underscored the low quality of consumer goods. For example, various manufacturing defects were discovered in the goods produced at 30 of 36 light industry enterprises where checks were carried out. The trade network was

supplied with products by the Prokopevsk, Kuzyayevskiy, Tuymazy and Riga porcelain plants which involved crude violations of the requirements set forth in the normative-technical documentation. Economic sanctions in the amount of 500,000 rubles were imposed upon the violators.

#### Rights of State Inspectors

Nevertheless, the level of use of economic sanctions is still inadequate, since according to available data the number of violations of the requirements set forth in the standards is decreasing only slowly and in fact it is even increasing at some enterprises of various branches of industry.

This situation results from the fact that many territorial organs, even when defective products are uncovered, are limited to employing only half measures and they fail to achieve a radical solution for the problem of ensuring the production of high quality products.

Recently a new institute of state inspectors for supervising standards and measuring equipment was introduced into operations. Compared to earlier when these rights were extended to organs, today they are being extended to specific officials. This imposes upon them great personal responsibility for the carrying out of all functions associated with Gosnadzor.

The inspectors have been granted extensive authority. In addition to employing economic sanctions and forbidding the sale of low quality products, they are now authorized to forbid the transporting, storage and use of products and the rendering of services in the sphere of domestic services if violations of the standards and metrological rules are involved. And they can also forbid the transfer over to a client (in production) and the use of design and technological documentation that does not conform to the requirements set forth in the standards or the metrological rules, when this can lead to a lowering of the technical level and the quality of the products. In accordance with the results of Gosnadzor, the inspectors can establish a special regime for the acceptance of products, in those instances where such production involves deviations from the standards, they can forbid the carrying out of tests in leading organizations for the state testing of products and they can discontinue work associated with the production, repair and control testing of measurement equipment.

An important innovation is the authority that has been extended to the chief state inspectors for the USSR and union republics, which allows them to issue mandatory instructions to enterprise and organization officials aimed at eliminating the production of goods in violation of the standards and metrological rules.

Thus the rights of territorial organs and their leaders are sufficient for achieving a considerable increase in the efficiency and effectiveness of state supervision over observance of the standards and technical conditions. And Gosstandart will monitor the situation to ensure that the territorial organs utilize the new rights in connection with enterprises which are performing poorly.

With regard to the all-round program that has been developed at the present time for improving the production of consumer goods and the sphere of services, it

is the opinion of Gosstandart that a great role could be played by the introduction of a categorical prohibition against the production of complicated domestic equipment, for which there are no documents attesting to the carrying out of state acceptance tests that would in turn indicate that the equipment conforms to the best domestic and foreign analogs.

It is considered advisable to establish a system in which the expenses for eliminating defects and correcting faults, detected after the products were turned over to a warehouse for finished products, and also the expenses for guaranteed servicing would be included in the planned computation of the production cost and the price for the product and would be repaid by means of the profit of the producing enterprise.

It is our opinion that a need exists for improving the system of relationships between the enterprises which produce the consumer goods and the trade organizations, particularly in matters concerned with reimbursement for discount expenditures and with the final computations for the sale of goods to the trade network.

In conclusion I would like to mention one important feature of the modern approach to the problem of quality. Today this problem has already gone beyond the work of quality specialists. Thus, in domestic and international practice, a special urgency is attached to teaching those means and methods which will ensure high quality products. Moreover, the training system must encompass all those participating in the production process.

Improvements in the level of competence of leaders and in the expertise of those required to carry out the work will facilitate to a considerable degree the solving of an important social task -- supplying the population with high quality goods and in the required assortment.

#### Economic Policy Based Upon High Quality Products

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 May 85 p 1

/Interview with V. Belobragin, chief of the Administration for State Supervision and Territorial Organs of Gosstandart; date and place not specified/

/Text/ The April Plenum of the CPSU Central Committee placed emphasis upon the fact that our economic policy must be based upon improvements being achieved in the quality of the products being produced. The enterprises and organizations in Tula Oblast are devoting a great amount of attention to this problem. Gosstandart /State Committee for Standards of the USSR Council of Ministers/ recently examined and approved their experience in developing the special purpose all-round "Quality" Program for the 12th Five-Year Plan. We asked a member of the committee, V. Belobragin, chief of the Administration for State Supervision and Territorial Organs of Gosstandart, to discuss the importance and features of this program.

I would like to emphasize the fact that the Tula program is based upon experience already accumulated throughout the country in controlling the

quality of products and upon use of the well known Saratov and Lvov systems and also the Shchekino method. Its purpose is to uncover and make greater use of during the next five-year plan of the reserves and potential available to the oblast's industrial enterprises for increasing the production of machines, equipment, instruments, materials and other products, in keeping with the technical-economic indicators for the highest international level.

The program calls for the following: growth in the production of goods approved for the State Badge of Quality, the development and mastering of new types of products in keeping with high international standards and new types of consumer goods which are in high demand and the timely removal from production of obsolete products.

It is important to note that in solving these tasks specific goals were outlined. For example, the proportion of high quality goods in the overall volume of products certified for the badge must be raised from 50 percent this year to 75 percent by the end of the next five-year plan and it must reach 80 percent at enterprises in Tula itself. Fifty-nine types of products considered to be of great importance to the national economy and in production throughout the oblast were singled out as requiring elevation to the highest international level in the immediate future. This includes bridge cranes, band conveyers, mine loading machines, harvesters for grain harvesting combines, motorcycles, microphones and telephones, jacquard machines and hosiery units, mineral fertilizers and others. Compared to the present five-year plan, the rates for the restoration of equipment during the next five-year plan will increase by a factor of 2-3.

/Question/ Viktor Yakovlevich, what are the means for achieving these goals?

/Answer/ The plans are based upon a thorough and comprehensive analysis in each collective, and the program encompasses 280 industrial enterprises and planning-design organizations, not only of the quality of the goods being produced and a comparison of them against the best domestic and foreign analogs but also of the technological level, the equipment, labor organization, personnel skills, the status of discipline, in short, the entire complex of factors affecting the final parameters of the output. Such analysis has made it possible to develop scientifically sound organizational-technical measures for improving quality.

For example, a thorough study was carried out at the Machine Building Plant imeni V.M. Ryabikov on the technology employed for producing parts which limited the reliability of the products and thereafter the technology was replaced by a more progressive one. Here the requirements for defect-free work in the brigades were strengthened and the decision was handed down that even a single incident of a product being returned would be sufficient cause for a 30 percent reduction in the bonus amount.

Special importance was attached to the fact that not only the work collectives but also the scientific-technical community should be motivated into participating in the formation of programs at all levels -- enterprise, rayon, city, oblast. This raised the validity of the contents of the programs and actually elevated them to the status of plans.

Each enterprise protected its own program through special working groups attached to rayon and municipal coordination councils for economic and social development. There were incidents of programs being returned for further development. For example, the following situation took place at the Yasnogorsk Machine Building Plant, which produces ore-loading machines. The planners -- Krivoy Rog VNIPIrudmash -- raised the productivity of this product somewhat during its modernization, but it did so at the expense of a deterioration in such parameters as power-intensiveness, metal-intensiveness. Naturally, we are not in agreement with such an approach for "improving" equipment throughout the oblast.

This is a fundamental question, since the Tula "Quality" Program is based upon an accumulation of the latest scientific and engineering achievements.

Question How closely are the tasks of a regional program coordinated with branch tasks?

Answer This is a very important point. Indeed, if the planned measures are provided with support in the form of the resources and financing required, then the successfully carrying out of these tasks can be guaranteed. This is why the oblast party committee, which headed up this work aimed at creating a special purpose all-round program, persistently strives to ensure that the program of each enterprise is coordinated with and approved by the appropriate ministry. And it bears mentioning that, with rare exception, complete mutual understanding has been achieved in this matter. The majority of the programs proposed by the enterprises were approved by branch staffs.

Question And what role was played by the organs of Gosstandart in the creation of the oblast program?

Answer The regional center for standardization and metrology, with the active participation of branch NII's /scientific research institutes/ and the VNIIS /All Union Scientific Research Institute of Standardization/ of Gosstandart, provides methodological management for this work. Its workers are entrusted with exercising control over the carrying out of the program and this requires that they display a high degree of responsibility in evaluating the work of the collectives in raising the quality of the products.

There is still one last point that I would like to focus attention on -- the general-purpose nature of the structural elements of the Tula program and its methodology. And, it follows, the possibility of the extensive spread of this experience in other regions.

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